

Flight

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

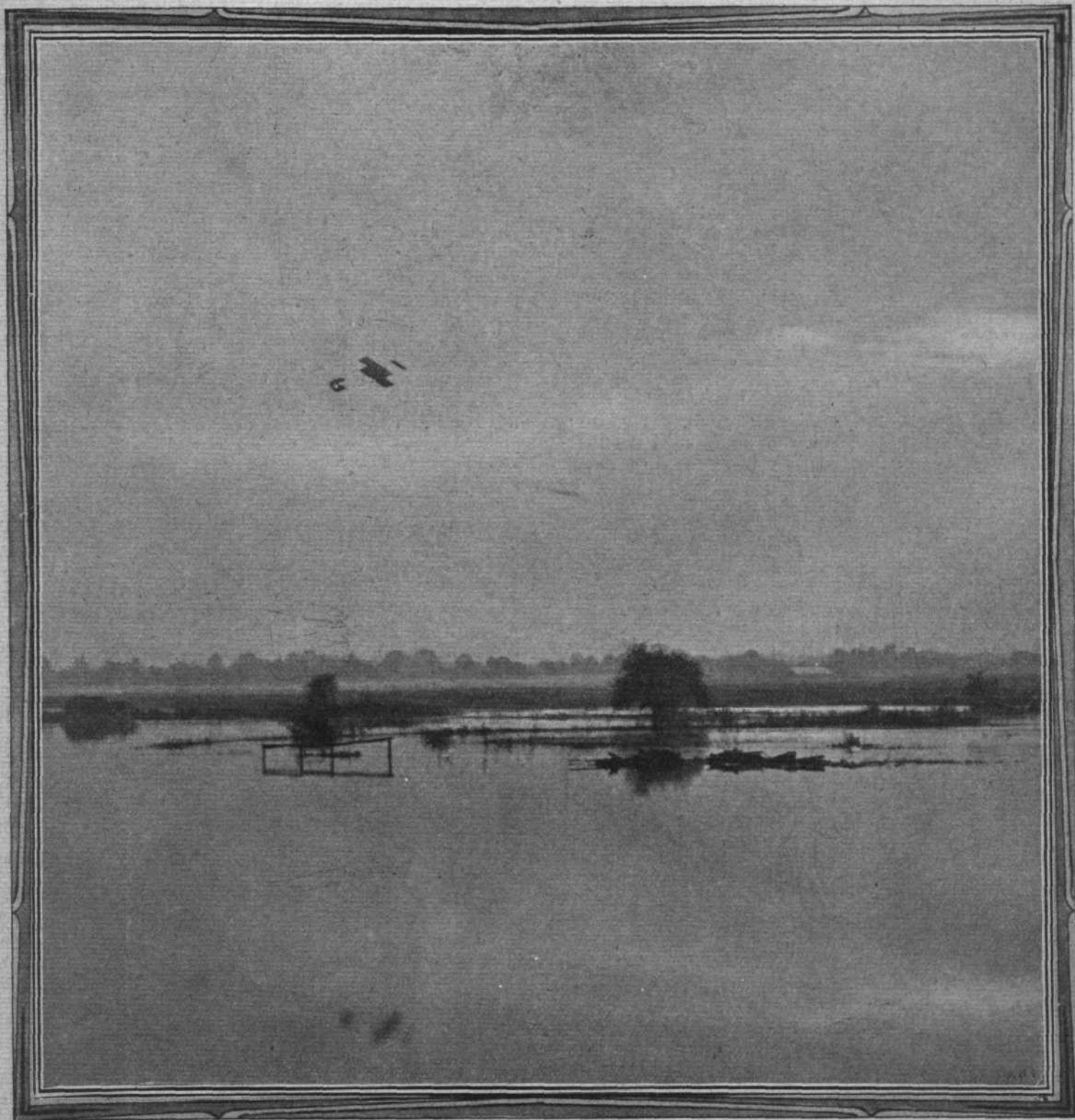
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"Flight" Copyright Photo.

FLIGHT PHOTOGRAPHS.—Another genuine photograph of an aeroplane when flying over water, showing the reflection in the lake. Our picture is of Paulhan at Brooklands, during one of his splendid exhibition flights on his Henry Farman machine. A comparison of this picture with the many published "faked" photographs of reflected machines is of considerable interest.

THE VALUE OF THE CORRESPONDENCE COLUMNS.

A WORD or two might usefully be said just now with regard to the correspondence columns of *FLIGHT*—their present utility and the even greater value that they may be given. And this is a subject well worth referring to on this page, if only in order to express our appreciation to those who are doing so much to make that portion of *FLIGHT* a thorough-going success. It is indeed a very great satisfaction to us to realise the vast amount of interest that is now running through those columns and the very generally healthy tone that pervades them week by week. And it is, moreover, all the more fitting that we should make this opportunity of referring to the subject, inasmuch as the correspondence columns of any such journal as this may become anything from invaluable on the one hand, to a mere waste of space on the other hand, according to circumstances over which no single individual can exert much direct control once the first start has been made.

Partly the reason why we refer to this matter, is that we have made a very real endeavour during the twelve months that *FLIGHT* has been before the public to steer the correspondence columns into a channel of which both we and our readers would at all times from now onwards have reason to be proud. We are glad to think that the inevitable risks of the correspondence drifting into an undesirable form whether in consequence of its improper use as a semi-veiled advertising medium, or of an altogether undisguised channel for the conveyance of senseless personalities between more or less biased individuals having their own axes to grind, has not only been effectively weathered during the months that have gone, but that as the result of the somewhat drastic wielding of the editorial blue pencil on our own part, the scope as well as the utility of this feature of *FLIGHT* has actually and unmistakably been enhanced.

In its present form the correspondence is valuable in the extreme, and we are therefore glad to perform our very obvious duty of welcoming an ever extending series of communications from readers, while at the same time thanking those whose co-operation has been so invaluable during the past few months. Probably we cannot do better than assure every reader of our sincere desire and firm intention to increase the educational value and the completeness of the columns in question, whether by the interjection of editorial comments or of accompanying illustrations, as has been done already, or whether by devoting an increased number of pages to it, and preparing special explanatory drawings and tables ourselves when the subject under discussion can thereby be still further elucidated by so doing.

While on this subject, moreover, we might usefully indicate the nature of the communications that are welcomed in particular by us. Primarily we trust that every reader desirous of information of any sort or kind connected with human flight will ask for it, mentioning specifically those difficulties which he has encountered; secondly, all those who have experiences to record would be conferring a benefit upon fellow workers and fellow thinkers if they would but take the trouble to give full particulars of the experiences in question; and thirdly, much useful work could be done for the general good of the aeronautic cause if those to whom suggestions occur would put them forward so that they may be thrashed out, and either adopted or abandoned once and for all according to

their merits or their accompanying drawbacks. A glance at recent numbers of *FLIGHT* can scarcely fail to indicate the sphere of usefulness that exists in these directions, and at the same time it must ever be borne in mind that even the most accomplished expert at the moment in questions relating to the science of human flight, is but a beginner as regards the marvellous new industry upon the threshold of which mankind is only just now standing. For this reason, no reader of *FLIGHT*, however elementary his aeronautic knowledge, need hesitate for fear of displaying his ignorance in committing his doubts and difficulties to paper. Ever it must be remembered that rapidity of progress is largely determined by the extent to which all those working towards the same end work in collaboration with one another, while apart from the technical or purely scientific side of the movement, the practical prospects of the coming industry depend enormously upon the readiness with which the interested public are capable of utilising mechanical progress. It is, in fact, at the time, almost as important that those who have no direct intention of taking a hand in the business side of a growing industry should acquire a sound working knowledge of the basic principles of aviation, as it is that those who ultimately intend to cater for public requirements should have a full and concise knowledge of those aeronautic problems in all their richness of technical detail. At the present time it is both the owner and user of the future, and also the individual units that will go to make the flight trade, for whom the correspondence columns of this Journal may prove an educational medium of the utmost all-round value. Therefore, it is to both, and indeed, to all classes of reader that we now once more extend the heartiest welcome of which we are capable to the correspondence columns of *FLIGHT*.

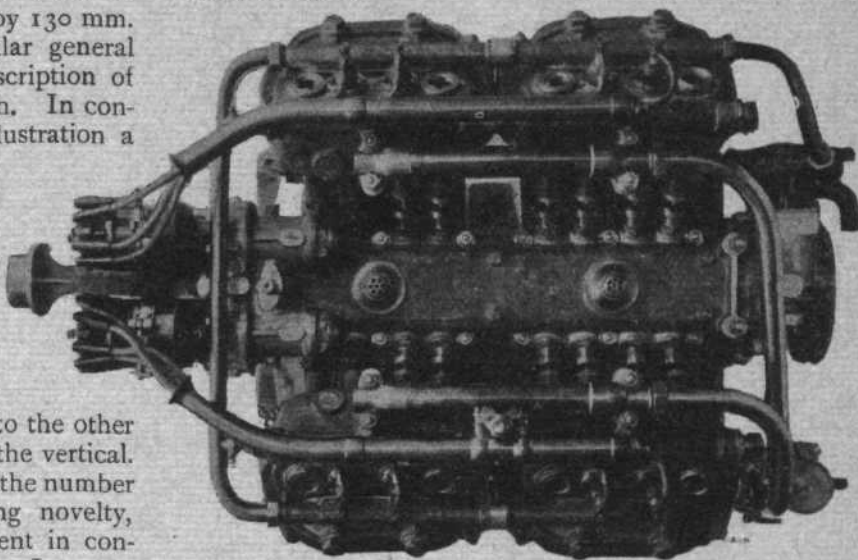
Already the hint has been broadly thrown out that the two types of correspondence which are *not* desired are, on the one hand, those which are out of place except in the advertisement pages of *FLIGHT*, and those which partake of the nature of personal duels, between contestants who may not unfairly be deemed to think more of their powers of hard hitting than of their capabilities either of clear thinking or of lucid expression of thoughts. Concerning the latter type of communications we shall unhesitatingly continue to wield the blue pencil mercilessly, as we have had to do at times before now. But as regards the former a word or two of comment might perhaps be in season for reasons that will then be made quite clear. In this connection it has to be borne in mind that the aeronautic industry has barely had time to fairly establish itself upon its feet, and that therefore there are occasions on which letters having a slight advertisement trend, which would be inexcusable in connection with a firmly established industry, are not only excusable in spite of the individual benefit they may confer, but are more than justified in that they enable pioneer workers to obtain what they require with a minimum of delay. Individual instances essentially demand individual consideration on their own merits, and that it is our own especial care to bestow. The main point is that we wish to assure readers of *FLIGHT* of the importance and seriousness that we ourselves assign to the pages that we devote to correspondence; and that we foresee the wisdom at this juncture of expressing satisfaction at the stage already reached.

LIGHT DE DION ENGINES.

THE special engines which are now being turned out by the famous firm, Messrs. De Dion Bouton, for use on aeroplanes and on dirigible balloons, at present embrace three models, two of which are of the V type and have eight cylinders, while the other is a 40-h.p. machine having four vertical cylinders of 120 mm. bore by 130 mm. stroke. The smaller of the V-type models is nominally rated at 35-h.p., and has cylinders of 90 mm. bore by 120 mm. stroke, while the larger is rated at 100-h.p., and has cylinders of 120 mm. bore by 130 mm. stroke. Both these latter engines are of similar general design throughout, so that the following description of the smaller to a large extent applies to both. In conjunction with it we reproduce in our first illustration a photograph taken looking down upon it from above, whilst in the other illustrations will be found a side and end view of the larger 100-h.p. model. As already mentioned, the following description refers more particularly to the smaller, inasmuch as there are one or two minor points of difference in the two. Four cylinders lie on one side of the centre line and four on the other, the one set being at an angle of 90 degrees to the other set, and therefore all lie 45 degrees out of the vertical. As regards this "V" arrangement, and indeed the number of cylinders, there is no particularly striking novelty, especially in view of petrol engine development in connection with dirigibles and flying machines. In many important details, however, there are radical departures from previous practice, notably in that the cylinders on the two sides are in the same line with one another, instead of being "staggered," and that each pair of opposed connecting-rods is in identically the same vertical plane. Another important detail can also be observed from our illustration, viz., that whereas the induction pipes lead from the carburettor to each of the four cylinder-castings, the exhaust passages are arranged within the castings themselves, and the outlets, to which are attached the exhaust-pipes, lie on the outside of the engine.

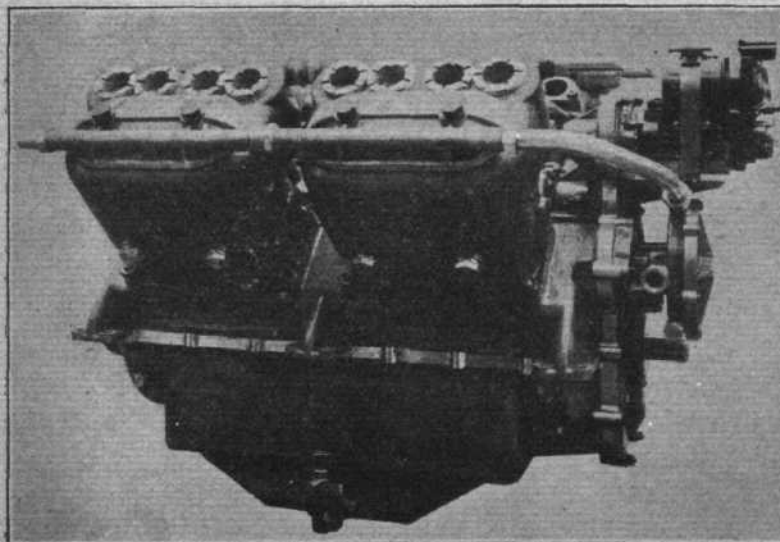
Each cylinder-casting is similar to that used for an engine of the ordinary vertical type, inasmuch as it

comprises two cylinders with all the valves arranged on the same side, with inspection covers above each of the four valves, with ignition-plugs in those covers that are situated over the inlet-valves, and with an ample water-jacket. Fixed to the crank-chamber as they are, all sixteen valves lie on the inside, and therefore lend themselves well to being operated from a single cam-shaft which lies along in a special casing immediately above the crank-shaft.

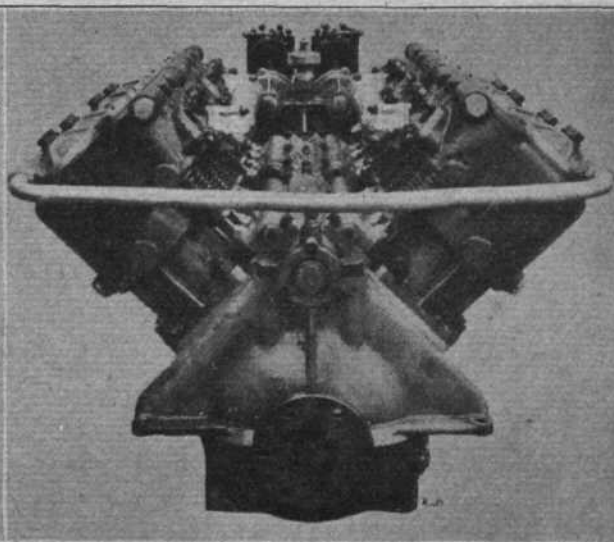


View from above of the 35-h.p. V-type engine that has eight cylinders of 90 mm. bore by 120 mm. stroke.

As reproduced, the front of the engine is on the left of our picture, the brackets carrying the starting handle being seen to project between the two high-tension magnetos, each of which serves one set of cylinders. The magnetos lie symmetrically on either side of the centre line, where they are driven at crank-shaft speed through enclosed gear-wheels from the cam-shaft, and the wires leading from them to the ignition-plugs are neatly enclosed inside tubing. The pipe work on the engine is indeed remarkable for its neatness throughout, this being



On the 100-h.p. V-type engine the circulating-pump is mounted on the front end beneath the magnetos instead of at the rear, as on the 35-h.p. model—a point which is shown in the above side view.



On the 100-h.p. 8-cyl. De Dion engine eight independent exhaust-ports open up inwardly from the four cylinder-castings, whereby a centrally-placed branched exhaust-pipe may be made to serve all eight cylinders. This and other details will be observed from the front view given above.

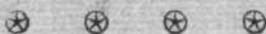
one of the points which is well demonstrated in the photograph. In addition to the induction-pipe, and those tubes to which we have just referred, no difficulty will be experienced in recognising the water-pipe that conducts the cooling water from the centrifugal pump at the rear end of the engine into all four cylinder heads, nor will the reader fail to observe that this centrifugal pump is mounted transversely and driven by worm-gearing.

Lubrication is on the forced system, operated by a special parallel-drive pump, which is situated at the front end of the crank-chamber, while in connection with it is installed the special pattern of drain cock and gauge used on the De Dion cars. The top of the gauge may indeed be observed quite easily, projecting up between

the two near-side cylinder castings in the close vicinity of the tube conducting the ignition wires.

Dimensions.

Cyls.	h.p. at r.p.m.	Bore. mm.	Stroke. mm.	Weight. kilogs.	Price. francs.
1	1	1,800	66	70	26
	4	1,600	84	90	50
	6	1,500	90	110	67
	8	1,500	100	120	98
2	9	1,500	100	130	106
	10	1,500	80	120	98
	10	1,500	66	100	104
	14	1,500	75	120	137
4	18	1,500	90	120	182
	25	1,500	100	130	240
	35	1,500	120	130	265
	70	1,000	150	180	670

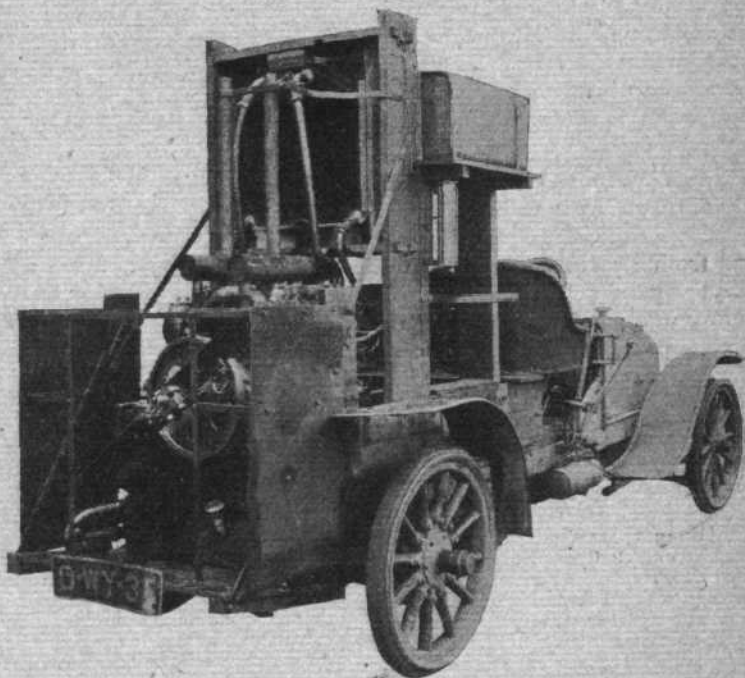


TESTING "WOLSELEY" ENGINES FOR FLYING MACHINES.

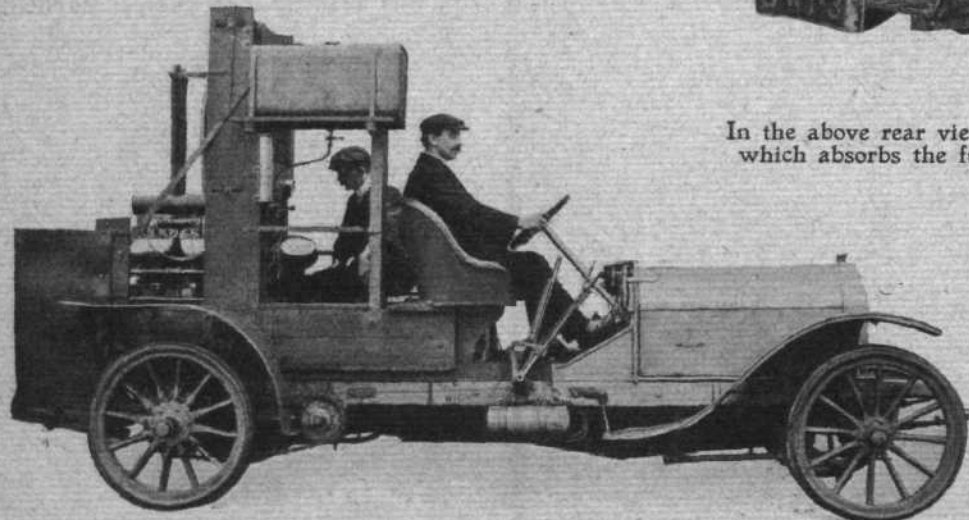
ALREADY brief mention has been made in these columns of the special method that has been adopted by the Wolseley Tool and Motor Co. at their famous Birmingham factory for testing the light V-type engines which they have been building for some time expressly for aeronautic work. We are now able, however, to demonstrate the precise means that are in vogue, whereby the prolonged brake tests to which every engine is subjected are conducted on a travelling test-bench instead of within the usual shops, for the two photographs reproduced herewith show the actual operation in process, including as they do two views of the motor car chassis with its complete testing equipment.

One of the standard 8-cyl. engines, which are nominally of 50-h.p., but which develop some 74 b.h.p., in spite of the total weight being only 300 lbs., is to be seen fixed on a special bed-plate at the rear of the chassis. The engine is, moreover, fitted with the large fan that constitutes the dynamometer, or power-absorbing brake which indicates the exact capabilities of the engine as regards output, and all the other instruments and accessories such as tachometer, fuel-tank, are installed around it just as they would be in any testing room.

shocks that are of a considerably more severe character than is likely to be encountered by it when at work under normal conditions at any future period. Smoothness



In the above rear view of the testing chassis, the air-brake, which absorbs the full power of the engine, is prominent.



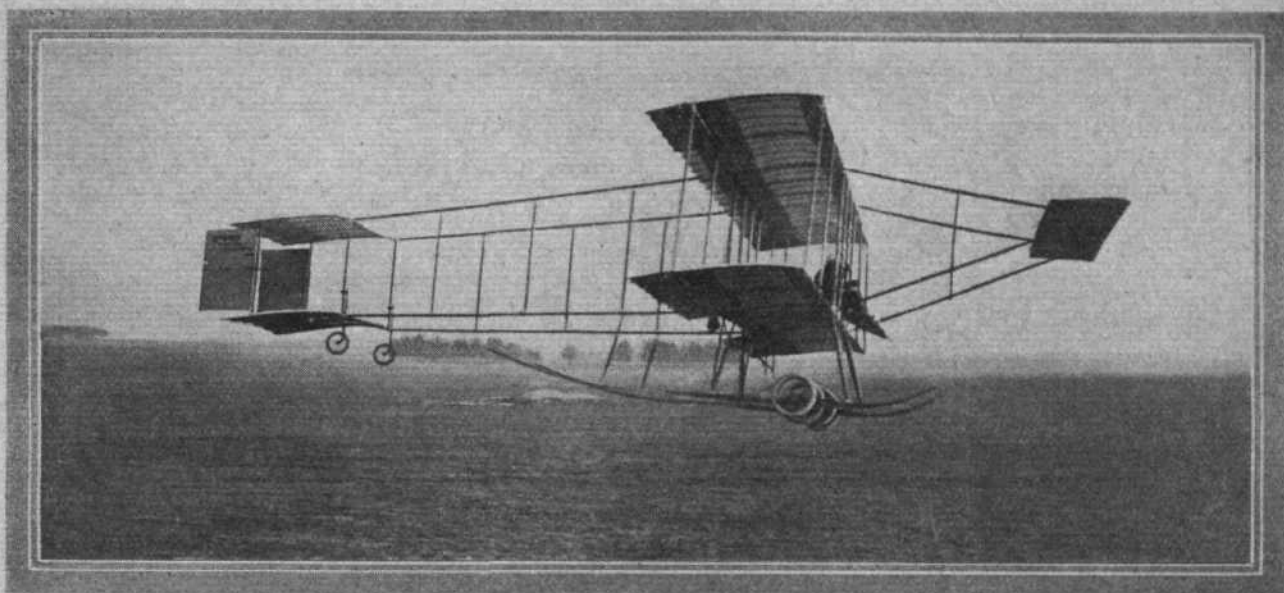
A 50-h.p. 8-cyl. engine is fixed in place on the test-bed at the rear of the chassis, and all the necessary apparatus is installed for a full-load run of long duration, while the chassis is being driven around the rough track at the Wolseley factory.

During the whole time the test is in progress, the chassis is being driven at a high speed around a rough track, which subjects the engine to a continuous series of

and efficiency of running are therefore tested in a manner which means considerably more to the purchaser than if the operation were performed on a stationary base-plate.

Considering the care that is taken to ensure reliability from these "Wolseley" engines, it is hardly to be wondered at that quite a number have already been supplied to experimenters who have been building aeroplanes, or that as a result of the performances of those already in use the demand for them has rapidly been increasing. Some of them have found their way to France, and have there fully proved their reliability in long flight.

MR. MORTIMER SINGER'S SUCCESS.



Mr. Mortimer Singer is one of the latest members of the Aero Club of the United Kingdom to make a number of successful long flights. Our photograph shows Mr. Singer, on his Henry Farman machine, in full flight at Chalons.

REMARKABLE success has been obtained at Chalons by Mr. Mortimer Singer with the Henry Farman biplane which he has recently purchased. His best performance up to the present is that of Tuesday last, when he flew 41 miles in 1 hour 1 min. 6 secs., and then only had to come down because of the cold wind. This is, of course, easily a record for novices, and in view of the short time he has been practising is a marvellous performance. Still further progress was made on Wednesday when during several flights Mr. Singer was accompanied by a pas-

senger. At his first attempt on the 16th inst. Mr. Singer flew for 4 mins., and on the following day, three flights were made of 10, 12 and 17 mins. duration respectively. The first two were ended owing to the cold numbing the aviator's hands, while the last flight was brought to an end by a stoppage in the petrol pipe. But for that, Mr. Singer could have continued for much longer. At times he was flying at a height of 70 metres, while the distance covered during the three trips was about 40 kiloms.

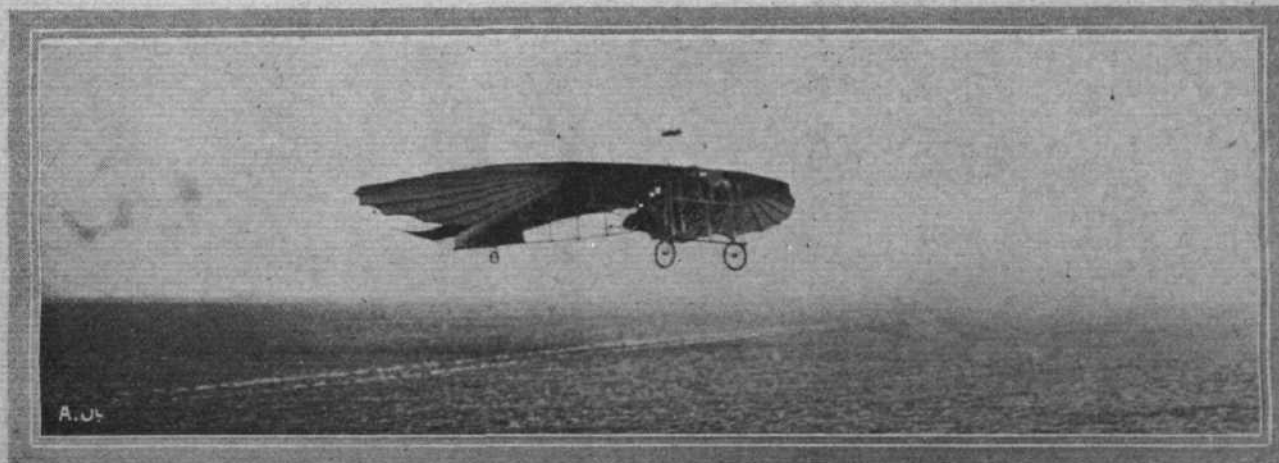
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A Long Cross-Channel Balloon Trip.

STARTING on Saturday afternoon last, the Hon. Mrs. Assheton Harbord, in her balloon, "Nirvana," piloted by Mr. C. F. Pollock, and accompanied by Mr. Philips Gardner, set up a very fine performance for the Aero Club Challenge Cup for the longest distance of the year. Battersea was left at 4.20 p.m., and just before Tilbury was reached it was feared that a descent would be necessary, but fortunately the wind veered round, and the balloon took a more southward course, passing over

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Canterbury and Deal. The Belgian coast was reached just below Ostend, and the aeronauts had some exciting experiences while crossing the Ardennes during the night. At one time it appeared that they were back over the sea, but it eventually proved to be a great waterfall, the sound of which resembled breakers, while what looked like the coast line was the bank of the river. Eventually the balloon landed near Hagen, Westphalia, having covered a distance of roughly 330 miles. The night was very cold, and at the greatest height attained, 8,000 feet, there were 17 degrees of frost.



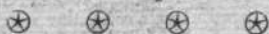
The Etrich monoplane on which Herr Etrich recently flew at Vienna for 4½ kiloms. at a speed of 70 kiloms. per hour.

AT THE AERO CLUB'S FLYING GROUNDS.

HON. C. S. ROLLS FLIES ACROSS COUNTRY.

A SHORT break in the villainous weather which has so long prevailed was productive of a good deal of interesting flying at the Aero Club's grounds in the Isle of Sheppey on Tuesday. At Shellbeach the Hon. Maurice Egerton was several times in the air, on his Short-Wright machine, although all his trials were of very short duration, while at Eastchurch Mr. Frank McClean, on a similar machine, several times flew round the Club's new auxiliary grounds there. The surprise of the day, however, was the fifteen miles cross-country flight of the Hon. C. S. Rolls. His Short-Wright machine had been into Messrs. Short Bros.' works near Leysdown for repairs, and finding these were completed to his satisfaction, he determined to fly back to his headquarters at Eastchurch. Steering first towards the coastguard station at Shellness, and passing close to the sea-wall, Mr. Rolls circled round

the aeroplane sheds, and then went off in the direction of Eastchurch, but bearing to the north in order to avoid the dykes and marshes. He arrived at Eastchurch quite unexpectedly, much to the surprise of those who were carrying out some preliminary tests with Mr. Gibbs' aeroplane under the superintendence of its designer, Mr. Dunne. It was just getting dusk when a distant roaring sound could be heard in the direction of Harty. Gradually the noise grew louder, and it was seen to be coming from an aeroplane which was soon recognised as that of the Hon. C. S. Rolls. On arriving at his destination Mr. Rolls continued his flight and circled round the ground several times before coming to rest. But for the intense cold, Mr. Rolls would have continued aloft for some time longer. Among the several interested spectators was Col. Capper.



AERO CLUB OF THE UNITED KINGDOM.

OFFICIAL NOTICES TO MEMBERS.

Aero Exhibition at Olympia.

The Society of Motor Manufacturers have decided to organise an Aero Exhibition under the auspices of the Aero Club of the United Kingdom, to be held at Olympia in March next. Members wishing to exhibit full-sized aeroplanes are requested to communicate with the Aero Club as soon as possible.

It is also proposed to organise an exhibit of model flying machines. Those desirous of exhibiting are requested to make application to the Aero Club. Free space will be given to model exhibitors, and prizes will be awarded, particulars of which will be announced later.

A circular has been sent round to all the Provincial Aero Clubs inviting their Members to exhibit models.

New Premises.

It is hoped that the new premises will be ready for occupation on Monday, January 3rd, when Members will benefit by all the advantages of a club-house, with the exception of a dining-room, which the Committee do not think necessary for the present.

Membership.

The next election of Members takes place on January 4th, 1910, when it is very probable that the list of Founder Members (1,000) will be complete. It would, therefore, be advisable for intending Members to send in their applications forthwith.

Additional Flying Ground.

The Aero Club have made arrangements with the proprietor of grounds at Eastchurch, to be used as an auxiliary flying ground for their Members. The ground is situated within half a mile of Eastchurch Station on the Sheppey Light Railway, and the same railway facilities will apply as at Shellbeach. The surface of the ground is very level and free from ditches.

A limited number of sheds may be erected on the grounds, and full particulars can be obtained from the Secretaries of the Club.

Designs of sheds must be submitted to the Committee of the Aero Club in the first instance.

Flight at the Aero Club Grounds.

Mr. F. K. McClean made a flight of nearly four miles in a circuit on Friday, December 17th, on his "Wright" aeroplane.

The work on the auxiliary ground at Eastchurch is proceeding rapidly, and many new sheds have been erected.

E. CLAREMONT, CAPT. R.N.,
HAROLD E. PERRIN,

Joint Secretaries.

The Aero Club of the United Kingdom,
166, Piccadilly, W.



A group of aviators and enthusiasts who are at work at Chalons attaining proficiency in the art of flight. Amongst the group are Baroness de la Roche, Miss Dorothy Levitt, Mdlle. Margvingt, MM. Maudle, Pouzelle, Labouchere, Hubert Latham, Somers Somerset, Mumm, Mattis, Demanest, Lindpaintner, de Barrye, and Hauvette.

THROUGH THE SUN IN AN AIRSHIP.*

By JOHN MASTIN, S.R.A.Scot.

JUST at the present time, when those who have school-boy acquaintances are racking their brains for an acceptable Christmas gift, it may be as well to draw attention to Mr. John Mastin's book, "Through the Sun in an Airship." This is an ideal gift for a boy with an imaginative mind, especially if he has in addition a turn for aeronautics. As may be gathered from the title, it is a tale of a wonderful airship, in which, among other exploits, its owner pays a visit to Old Sol himself—nay, even has the temerity to venture inside him. It is a book after a boy's own heart, and is written on the lines of Jules Verne's and H. G. Wells' imaginative and scientific stories. Conceive an airship that possesses within itself the power not only to overcome gravity but also to control its own gravity and that of other bodies—an airship that can attract planets out of their orbit, or repulse them with equal force. Add to this that the owner and his two friends discover how to make the "Regina" (for that is the airship's name) invulnerable to the fiercest heat, and some idea may be gathered of the exciting adventures which, under the guiding hand of Mr. Mastin, are revealed to the reader. To whizz round Earth and back again to the starting point in but a few minutes; to hold communication with Earth from any point of space (even from the middle of the sun) by means of telepathy; to carry sufficient luggage and food for several months in one's waistcoat pocket; and to photograph a planet's life-history by means of its light-rays travelling through the void; these

* Griffin and Co., Ltd., 6s.

are a few of the extraordinary doings of the owner of "Regina" and his friends, which perhaps read with a fantastic unreality to an unimaginative mind. Visits are paid to the various planets, and the vistas of infinite space as seen from this wonder of man's invention as she spins through the ether swiftly and silently, are vividly described. Then when all is ready our adventurers head for the sun, marooning a few mutineers *en route* on a planetoid conveniently near. What they find upon Jupiter, Mars, Venus, Luna and in the Sun we must leave to the prospective reader to discover; suffice it to say that as the author unfolds marvel upon marvel, one's breath is almost taken away by the chapter of events.

It is perhaps somewhat disappointing to be completely left in the dark as to the principle of working and the source of the power possessed by this mysterious airship. But the vagueness of the description of the actual machine will detract in no way from its fascination for boys, and as the story is evidently intended for inclusion among juvenile literature, it certainly fulfils its purpose. The author is a clever scientist, with a profound knowledge of physics, chemistry, and astronomy, and it is therefore hardly necessary for us to lay stress on the interest and fascination such a book will have for the young idea, and the knowledge incidentally gained in its perusal.

The present book is a companion story to "The Stolen Planet" by the same author, the history of the marvellous "Regina" being continued in "Through the Sun in an Airship."

REVIEWS OF BOOKS.

Laboratoire d'Essais Aerodynamiques.

By S. DRZEWIECKI.

(Paris: L. Vivien.)

THIS little pamphlet was written in order to draw attention to the necessity of establishing a flight laboratory for the purpose of furnishing aviators with the data necessary for the construction of their flyers, and concludes with a brief summary of the author's opinions as to what should be the initial work of that laboratory.

Monographies d'Aviation.

By A. BRACKE.

(Paris: L. Vivien. 75 c.)

IN this series of small pamphlets M. Bracke treats miscellaneous subjects in such manner as it appears to him to most suitably cover the ground. In some cases he collects machines of the same type together, as for instance when dealing with flapping flight, and on other occasions he takes one make at a time, as for instance when describing the Cornu helicopter. The Bleriot and the Wright flyers naturally have a pamphlet each.

Des Helices Aeriennes.

By S. DRZEWIECKI.

(Paris: L. Vivien. 2 fr. 50 c.)

THOSE seeking mathematical investigation of the underlying principles of the aerial propeller should obtain M. Drzewiecki's work, for it goes into the subject

with considerable detail, although, being essentially a mathematical analysis, it is perhaps hardly to be recommended to those wanting an elementary explanation of how a propeller works. The scarcity of books on the aerial propeller enhances the value of that which Messrs. Vivien have published.

Force Portante de l'Aeroplan.

By FARAUD.

(Paris: L. Vivien. 2 fr. 50 c.)

IN this brief pamphlet Major Faraud investigates a formula for the lift of aeroplanes, which he applies to a practical machine by sub-dividing the treatment of his subject into separate sections, as follow: resistance of air, weight of the planes, weight of the engine, weight of the mechanism, speed of the propeller, angle of incidence, useful load.

L'Aeroplan des Freres Wright.

(Paris: Berger-Levrault. 1 fr.)

THIS little work, which is more in the nature of a pamphlet, relates to the early experiments of the brothers Wright, and also deals with their patents. In the text are given a miscellaneous collection of dimensions relating to one of their actual machines, and at the end of the book there is a sheet containing drawings of a diagrammatic character which have been prepared from a patent.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

(NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary.)

Aviation Association of Ireland.

AT an informal meeting, held at the Metropole Hotel last week, Mr. J. B. Dunlop presiding, on the motion of Professor Lilly, seconded by Mr. Trench, it was resolved that an Association should be formed under the title of the Aviation Association of Ireland. A committee, consisting of the following, was formed to consider various details, and proceed with the organisation:—Messrs. Dunlop, Lilly, Percy, Mecredy, Doig, Hutton, Wilson, Scally, Trench, Coghill, Dunphy, Gill, and Roche.

Birmingham Aero Club (62, ALBION STREET).

A LECTURE on model construction was given, on the 16th inst., by Mr. Maxfield at the workrooms of the Birmingham Aero Club. A large number of members were present and took great interest in the paper. In thanking Mr. Maxfield, the chairman (Mr. H. H. Chatwin) emphasised the need of local support for the club, and pointed out that funds were badly needed for better equipping the workshop.

Liverpool Aeronautical Society (1, EXCHANGE STREET WEST).

WITH the object of forming a boys' section of the Liverpool Aeronautical Society, a model flying machine competition took place on Saturday last at the Liverpool Collegiate School, Shaw Street. The head master of the school has taken from the first a great interest in this new sport for boys, and kindly offered the use of the playground for the competition, and the hall for the lecture which followed. Fifty models were sent in for competition, some showing many interesting features in design and workmanship. Fifteen schools were represented, the Liverpool Collegiate School sending

in twenty-six entries and the Institute six. Three prizes of £2 2s. were offered by the proprietors of the Bon Marche, the winners being:—For boys under twelve, Harry Aitchinson, Great Homer Street Wesleyan School; boys under fourteen, W. Hoffmaster, Higher Elementary School, Liscard; boys under sixteen, R. Ashburner, Liverpool Collegiate School.

Subsequently Mr. P. L. Charlier delivered a lecture, illustrated by lantern slides and diagrams, on "How to Become an Aviator." All interested in the formation of the boys' section of the Aeronautical Society are invited to write to Mr. P. L. Charlier, Liverpool Collegiate School, or to Mr. J. Wright, 1, Exchange Street West, and the objects of the society are stated to be to promote amongst boys an interest in aviation by means of fortnightly lectures and demonstrations, practice in gliding flight, &c.

Manchester Aero Club (9, ALBERT SQUARE, MANCHESTER).

THE exhibition of model aeroplanes which the club propose to hold will take place at the Manchester White City on February 4th and 5th. Striking proof of the growth of public interest in flying, and of the efforts that are being made to meet it, is given by the fact that no fewer than 200 firms and individuals have already promised to exhibit models, and it is pleasing to note that the proportion of private exhibits is very large. The club has decided that the entrance fee for the first machine shall be half a crown, of which eighteenpence is returnable when the machine is staged, and for second and subsequent machines a fee of only sixpence will be charged. Prizes will be awarded, and as there will be plenty of room in which to try the machines the exhibition should be exceedingly interesting.

Count Lambert a Chevalier.

IN recognition of his life-long study and great work in the cause of aviation, Count Lambert has been created a Chevalier of the Legion of Honour.

A Sensible Free Christmas Souvenir.

MR. ROBERT W. COAN, of 219, Goswell Road, E.C., the well-known practical worker of pure aluminium, has sent us a charming aluminium fruit or card dish, about 13½ ins. by 9½ ins. wide, which is reproduced on this page. We do not know how he does it, but this is given away by Mr. Coan as a Christmas souvenir to his customers. As he asks us to mention that any customer who has not already received one can obtain it by applying, we would advise them to write at once, as without a very large stock of them is in reserve, we are afraid disappointment will result. The only advertisement appearing on this dish is underneath, and should prove useful as a permanent reminder of Mr. Coan's address.



Mr. R. W. Coan's useful Christmas souvenir, sent free by him to his customers.

"Professor" Parseval.

MAJOR PARSEVAL, the designer of the "Parseval" airship, has just been appointed to the chair of aeronautics founded at the University of Charlottenburg. Herr Dietzms, who is Professor of Naval Architecture at the same institution, will also lecture on the construction of dirigibles and aerial navigation.

Ae.C.F. Pilot Certificates.

ON and after January 1st, the Aero Club of France will issue their *pilote-aeronaute* certificate for ballooning without charge, to those who fulfil the necessary obligations, in the same way as they do with the certificates for *pilote-aviateur* and *pilote-aeronaute*. A *pilote-aviateur's* certificate has been granted to M. Leblanc.

Grand Prix d'Aviation A.C.F.

THEIR attempt to organise a motor car Grand Prix race having fallen through, the A.C.F. are now turning their attention to the flight Grand Prix which they propose to hold next July. At their last meeting the Commission Auto-Aerienne appointed a sub-committee consisting of the Marquis de Dion (President), MM. Archdeacon, Edmond Chaix, Commandant Ferrus, G. Gobron, Chevalier René de Knyff, Georges Longuemare, A. Loreau, Comte Récopé, G. Rives, Surcouf, Comte de Vogüé, G. Lumet (Technical Secretary), du Bousquet (General Secretary), to draw up the rules and proceed with the organisation. It is proposed that the event should be a cross-country one, probably from Paris to Brussels.

"Official Observers" in France.

FOLLOWING the lead of the Aero Club of the U.K., the Aero Club of France have appointed honorary official observers who will act with the official timekeepers in recording aeroplane flights. The official observer would be required to verify the distance covered by the competitor, while the timekeeper would certify the time.

THE GYROSCOPIC BALANCING OF AEROPLANES.

MARMONIER'S GYROSCOPE PENDULUM.

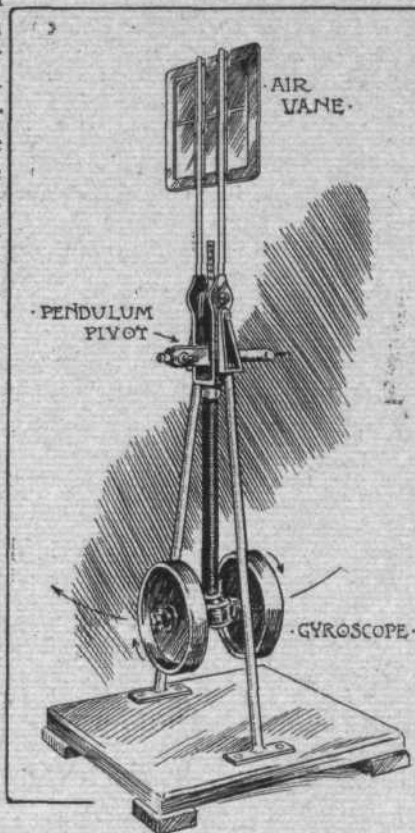
EVERYONE acquainted with the action of a pendulum knows how it hangs straight down if freely pivoted or swings into an oblique position if the frame carrying the pivot moves abruptly to one side. The general nature of the reactions associated with a pendulum are all perfectly straightforward to the non-technical mind, and any general scheme in which a pendulum is employed as a regulator can in consequence be quite easily understood. Most people are also familiar with the gyroscope, at any rate in the form of a child's spinning top. The actions of a gyroscope are, however, less commonly understood, and for that reason it is necessary to briefly point out one of the leading phenomena associated with its action. A gyroscope, which essentially consists of a fast-spinning fly-wheel, has this peculiarity, that when its axis of revolution is tilted up or dipped down, the reaction brought into play by this applied force introduces a tendency for the axis of revolution to swerve to the right or left. This apparently violates the ordinary straightforward idea of action and reaction being equal and opposite, and we do not purpose to go into any explanation of the why and wherefore of the phenomenon, it being sufficient for our immediate purpose to draw attention to the peculiarity.

If a gyroscope replaces a pendulum bob, there is a combination of the two effects, which naturally results in a modification of the normal pendulum action, and on this scheme Louis Marmonier has based his idea for the automatic balancing of aeroplanes.

M. Marmonier points out that the pendulum alone is unsatisfactory for the purpose, because, although its weight tends to keep it vertical, it does not, after being disturbed, definitely resume that position until after it has made a series of oscillations. Furthermore, M. Marmonier realises that the centrifugal force of a heavy pendulum would be a source of great danger in turning. A simple gyroscope alone M. Marmonier considers would be insufficiently powerful to perform the work required even if operated through a relay mechanism, and would, he considers, further be liable to a change in the direction of its axis by insensible degrees, which would nevertheless alter the neutral course of the flyer. A very heavy gyroscope, M. Marmonier points out, could not be used because of its weight and the force required to drive it, and especially because its inertia would interfere with the necessary manœuvres of the flyer.

But, although neither the gyroscope nor the pendulum will alone accomplish the object desired, M. Marmonier considers that the effects sought can be obtained by a combination of the two principles. In the Marmonier apparatus two fly-wheels are mounted on a short horizontal

shaft which is attached at its middle point to the lower end of a vertical rod. The whole forms a pendulum which can oscillate only in the plane containing the axis of the wheels and perpendicular to their forces. The pendulum rod is prolonged above its axis of suspension, and its upper end carries a vane parallel to the faces of the wheels. The function of the vane will be explained later. The gyroscope is driven by the main engine through some suitable transmission mechanism, which does not disturb the pendulum action.



A gyroscopic pendulum of this construction, moving in a straight line perpendicular to its plane of oscillation, tends always to remain absolutely vertical, even if subject to violent lateral displacements. The only force which tends to make the pendulum swing is one of angular displacement, that is to say, when the aeroplane to which it is fitted changes its course so as to rotate the apparatus about its vertical axis. The effect of this torque is to swing the pendulum either to the right or to the left, the direction being determined by the direction of rotation of the gyroscope fly-wheels. The inclination or swing of the pendulum will increase with the magnitude of the original disturbing torque, and will also be inversely proportional to the length of pendulum. It will, therefore, be a maximum when the pendulum length is zero, which, of course, would mean that the apparatus was a

simple gyroscope. Directly the disturbing couple ceases to act the pendulum returns to its vertical position.

Another fact to be taken into consideration is the natural centrifugal force on the pendulum apparatus considered as a pendulum alone, and the result of this is that the direction of rotation given to the gyroscope fly-wheels is such that their gyroscopic tendency is to swing the pendulum inwards when the aeroplane is travelling over a circular path. The natural pendulum action is, of course, to swing outwards, and consequently the opposing forces can be made to produce any desired resultant.

The function of the vane attached to the top of the pendulum rod is to provide an automatic compensation for variations in the direction of the wind. If the wind blows obliquely to the line of flight, its pressure on the vane, which normally travels edge-on to the wind, is such as to create an initial tilting force on the pendulum, and thus to modify to a proportionate extent the effect of the pendulum and gyroscopic action.

The precise means by which the device could be made to operate upon the controlling members of a flyer would, of course, require working out independently for each particular machine.

A Flying Ground at Osborne.

FORTY acres of ground at Osborne have been leased by Messrs. Saunders and Co., of East Cowes, who will

establish there a branch of their works for the construction of flying machines, which will be tested on the adjoining ground.

AVIATION NEWS OF THE WEEK.

Mr. Roe at Wembley Park.

HAVING outgrown his present practice ground at Wembley Park, the authorities there have cleared away some more trees and railings so as to allow Mr. A. V. Roe to make circular flights. Since he has fitted his new engine to his triplane much better results have been obtained and Mr. Roe hopes to make flights every day now. Notices will be exhibited at the Metropolitan Railway stations when flying is in progress.

Mr. Ogilvie has a Mishap.

WHILE flying on his Wright machine at Combe, on Friday of last week, Mr. Ogilvie met with a mishap while flying at a height of 150 feet. The machine suddenly dropped down and stuck in the sand. The propellers and other parts of the machine were slightly damaged, but fortunately Mr. Ogilvie escaped very serious injury.

Pickersgill Monoplane.

ON the 16th inst. Mr. J. T. Pickersgill, of Keighley, had his new monoplane out, and hoped to have had a trial with it. The engine was tested and found to be all right, but when the word was given to start apparently the engine was accelerated too quickly, for the chain drive to the propellers snapped. In consequence, the trial was abandoned.

Aviation Classes.

So successful were the series of classes for instruction in flying, conducted by Mr. T. W. K. Clark, B.A., in connection with Motor Schools, Ltd., that arrangements have been made to repeat them after Christmas. The fee for the course of six classes is one guinea.

M. Bleriot's Accident.

FROM the reports received from Vienna it would seem that M. Bleriot was much more seriously injured in the accident at Constantinople than was at first supposed. He was conveyed to Vienna on Sunday, and during the journey his condition became serious. He was placed under the care of Professor Hochenegg, who called in the aid of two other prominent physicians, who diagnosed the injuries as contused ribs, spleen and

liver. All who take the slightest interest in flying will extend their sympathy to the plucky cross-Channel hero, and join in wishing a speedy and complete return to health and vigour.

Lesseps Flies 1 hr. 30 mins.

ONE of the most wonderful performances made by the newer generation of flyers so far, has been that on the 16th inst., when M. J. de Lesseps, at Issy, flew for 1h. 30m. 28s. It was only the fourteenth time that the new aviator had been out on his Bleriot, and when he started at 20 minutes to four it was with the intention of making his third qualifying flight for his Ae.C.F. Pilot's Certificate. The necessary distance accomplished, M. de Lesseps determined to go on in spite of the gathering darkness. His friends tried to signal by means of their motor car lamps to him to land, but he kept on for an hour and a half, then landing without the slightest difficulty. This is the record flight which has so far been made at Issy, and is also a record duration flight for a Bleriot machine.

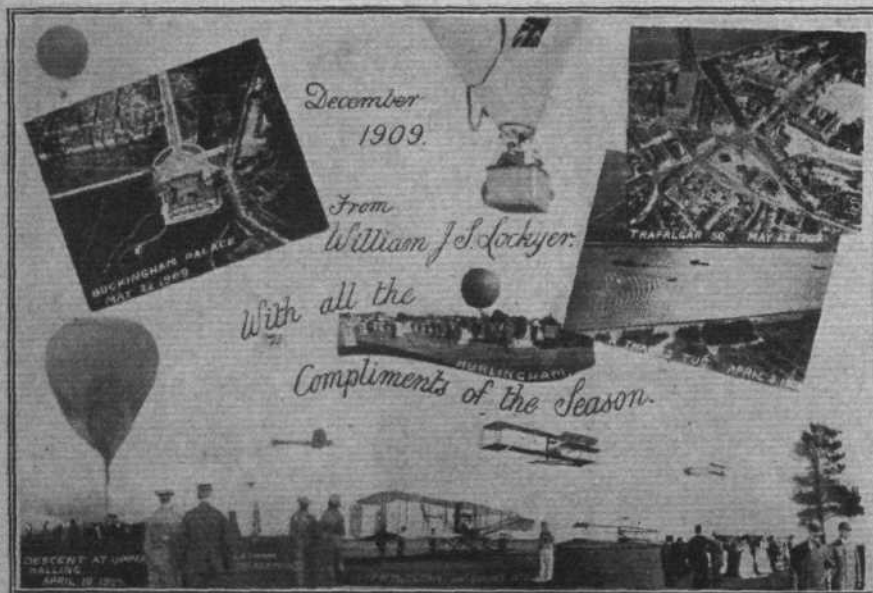
On the previous day M. Lesseps had covered 7 kiloms. in 12 mins. in his attempt for the Colorado-Mansfield prize of the Ae.C.F. So successful had M. Lesseps' trials proved that he entered for the *La Nature* prize of 10,000 francs for the first flight of 100 kiloms. in a straight line, and also for the second of the Ae.C.F. cross-country prizes, value 7,000 francs. On Tuesday, in the presence of about 500 spectators, he made a good start from L'Etampes and intended to land at Nonan-le-Fuzellier. The ground was frozen hard, and the machine rose quickly to a height of 30 metres. Following the Dourdan road, M. Lesseps crossed the Lucette and Chalonette valleys, but when about 6½ kiloms. from the start the motor gave signs of slackening speed. This caused a hasty descent to be decided upon, and the machine landed on a bush. The front of the flyer was damaged, the propeller, of course, bearing the brunt of it, but M. Lesseps, who escaped injury, hopes to have this repaired in a day or two, when he will make a fresh start.

Latham's Passengers.

ON the 15th inst. Mr. Latham made several flights with each of his ten pupils, and also took up Capt. Durand and Capt. Lucas-Gerardville, who was one of the three pupils taught by Wilbur Wright in France. He also gave his friendly rival, Paulhan, a trip round the aerodrome, and Kuhler succeeded in traversing the camp several times. Among the passengers taken up by Mr. Latham on the 18th inst. was his own cousin, Pierre Latham.

Weight Lifting by Paulhan.

ON the same day Paulhan made a noteworthy performance. Although a gusty wind was blowing, he determined to try a new Henry Farman machine in which poplar has been used instead of ash, so saving weight. The machine is also smaller than the usual type, but despite this he carried two passengers weighing together 330 lbs., and also took 10 gallons of petrol. He would thus appear to have beaten all records as regards weight-lifting.



A seasonable greeting card from Dr. W. J. S. Lockyer, embodying a series of interesting reminiscences of the past year.

Molon at Havre.

MOLON has been steadily practising on his Bleriot monoplane at Bléville, near Havre, and on Sunday made several flights of between 4 and 5 kiloms. On the next day he went up nine times, the cumulative distance flown being about 60 kiloms. In one of his trips he flew for some distance above the Etretat road, and at a height of 30 or 40 metres he returned along the same route.

Rougier at Issy.

ON the 20th, Rougier appeared at Issy, and commenced trials with a new Voisin biplane fitted with an E.N.V. motor. The machine differs from the old machines in several ways, notably in the new arrangement of the chassis, and also in the vertical panels. Rougier says that the machine is much faster than his old one, and also that he can manipulate it much more easily. More than once he cut off the ignition, and glided to the ground quite easily.

Flying at Pau.

ON the 15th inst. Mr. Claude Grahame-White made, without difficulty, the second of his qualifying flights for his Aero Club of France pilot's certificate, and the third on the following day, as also did M. Aubran. Mr. Grahame-White was also practising gliding flight, and several times when at a height of 50 metres he cut off the ignition and planed to the ground, following the example of his master. M. Aubran, on the 16th, flew over to the Wright aerodrome and back. A lady is now numbered among the Bleriot pupils, Miss Spencer having commenced to take lessons on Monday of last week. On Friday an attempt at flight was made, but the tail fouled the ground and so the trial was abandoned. The other pupils, Prince Bibesco, Comte de Vogue, and MM. Mamet and Lesna all made short flights.

Having erected his machines, M. Tissandier has also resumed his teaching, and on the 15th made a flight of 15 minutes duration, and on the following days was giving lessons to Count Malinski and MM. Bruneau and Laborie.

In view of the large number of flyers practising at Pau a new flying ground for the more proficient is being prepared adjoining the present Bleriot school, and a course measuring 10 kiloms. round is being arranged for.

Activity at Juvisy.

DELAGRANGE, on his Bleriot monoplane, has been continually practising during the past few days, and on the 16th inst. he indulged in a little aerial excursion over Savigny, Viry, and Juvisy. Koechlin, on the same day, flew round the course ten times on his monoplane, and Count Lambert also made a fairly long flight with a passenger on a Wright machine. The previous day, Ladongne succeeded in making several circuits on the Goupy biplane.

A Lady Flyer at Rheims.

ON the 14th inst. Mdle. Marvingt, who has been taking lessons on a Hanriot monoplane at the Rheims school, made a successful flight, which entitles her to claim that she is the first woman to pilot a monoplane. Ruchonnet, on a similar machine, and on the same day, flew round the course five times at a height of ten metres.

A New Biplane at Tours.

M. CLUSON made his first trial on the 17th inst., at Tours, with a new biplane fitted with a Rolland-Pilain motor, flying for 100 metres. The machine rose to a height of 6 or 7 metres, but in landing a wheel was damaged.

The Cannes Meeting.

It is anticipated that the alterations and improvements which are being carried out at the Napoule race-course by the Municipality of Cannes in preparation for the flying meeting from April 3rd-10th, will be completed by the end of January, and that some of the flyers will commence practising there shortly after. The Town Council have voted 40,000 francs for the official opening of the flying ground, and the prizes at the meeting will exceed 100,000 francs.

Two New L.N. Prizes.

WITH the object of encouraging new flyers the Ligue Nationale have resolved to offer the 1,000 francs prize given by M. Caplain-Berger to the pilot who, not having previously won a prize of greater value than 1,000 francs, passes over a ballonette 100 metres above the ground. They have also decided to give the 1,000 francs prize, given by the students of the Central School of Arts and Manufactures, to the aviateur who first makes a cross-country flight of 10 kiloms. in a straight line carrying a passenger.

Ae.C.F. Affiliations.

THE Aero Club of Normandy, which has just been formed with headquarters at Deauville, has become affiliated to the National Club in France, as has also the Algerian Aero Club.

M. Sommer Building.

THE fact that M. Sommer has sold his Henry Farman machine and left Chalons Camp, seems to have given rise to the rumour that he has given up flying. So far from that being the case, however, he is actively engaged at his felt works at Douzy, in the Ardennes, in putting the finishing touches to a new biplane of his own design, but of which no details can be published until the patents are secured. M. Sommer has also a monoplane in course of construction.

Flying at Algiers.

GOOD progress has been made recently by M. Metrot, who has been flying a Voisin biplane on the Joinville ground just by Algiers, and on the 15th he ventured to make a trip over the surrounding country. Taking a wide sweep he eventually reached Bida, 3 kiloms. away, where he rounded the clock tower of St. Charles' Church, at a height of about 150 metres. He eventually landed within about 20 metres of his shed, having covered about 20 kiloms. in 16 mins. On the 17th inst., M. Metrot flew between 3 and 4 kiloms. accompanied by his mechanic. On the previous Tuesday M. Metrot evoked great applause by racing an express train for 7 kiloms. The train of course was badly beaten, and then the aviator flew back without incident.

The Dufaux Biplane.

MM. DUFAUX FRÈRES, the manufacturers of the Motosacoche motor cycles, have recently built a biplane with which they are obtaining very good results so far. The main planes are similar to those of the Bleriot machine except that there are two superposed, and lateral

stability is obtained by small ailerons placed between these two planes at their extremities. The machine is fitted with a three-cylinder Anzani motor of 25-h.p. and weighs 180 kilogs. On its first trial the machine rose to a height of two metres and traversed a distance of 50 metres.

Flying at Cairo.

BARON DE CATERS is the first man to fly in Egypt, having made several short trips on his Voisin biplane at Cairo on the 15th inst.

Aeroplanes Ordered in England.

WE are informed by Mr. Cunliffe W. Elliott that he has received orders for three Latham type monoplanes, which are to be built at Twickenham. Two of them are for French owners, while the other is for a well-known English sportsman. The former fact indicates that the French do not by any means hold the market in aeroplane construction. The flyers are to be fitted with motors of 50-h.p.

A Youthful and Light Aspirant.

AMONG the correspondence received by Mr. Howard T. Wright a day or so ago was a letter from a young gentleman anxious to be employed as a driver on one of the Howard Wright aeroplanes. Among the qualifications for the berth which he seeks, he mentions that he only weighs from three to four stone, and will be thirteen next birthday. The child is indeed the father of the man.

Aladdin Up-to-date.

WHEN Aladdin made his appearance at the Lyceum Theatre on Thursday last it was found that during the past year he had become quite up-to-date in his ideas. When he becomes wealthy in the first act



The Lyceum Up-to-Date Aladdin.

he determines to invite all his friends to an aviation meet in the palace grounds. The wicked magician then swoops down and carries off the Princess in his monoplane. At one time there are five Bleriot monoplanes swooping over the Lyceum stage, and some extraordinary scenic effects are obtained in the pantomime.

AIRSHIP NEWS.

The New German Military Dirigibles.

BOTH the new German dirigibles "P. III" (Parseval) and "M. III" (Gross) having been accepted by the military authorities, will be kept at Tegel for some time and tested together. The former was to have been sent to Leichlingen at Cologne, but the shed there is at present fully taken up with "Zeppelin II," which is being overhauled and modified. The envelope of "M. III" is 86 metres long and 12 metres in diameter at the greatest point, the capacity being 8,000 c.m.

Forlanini Dirigible.

CONSIDERABLE success attended the first long trial of the new Forlanini dirigible on Wednesday of last week. Leaving its shed at Crescenzago, the dirigible flew to Milan, rounding the tall Cathedral spire. Then Monza was visited, and after circling round the King's villa, the airship returned to its shed, having been aloft an hour and twenty minutes, during which a distance of 32 kiloms. was traversed. The dirigible is of the semi-

rigid type, and it is stated to be peculiar for the fact that the envelope is divided by a diaphragm, only the upper half being filled with gas. The envelope is 40 metres long, 14 metres in diameter, and contains 2,500 cubic metres. The motor is of 40-h.p.

The Willows Airship.

ON Saturday afternoon Mr. E. T. Willows had his dirigible out for a trial, but, in view of the wintry weather, it did not extend over more than half an hour. During that time the airship rose to a height of about 200 ft., and manoeuvred over the East Moors.

A "Mare's Nest."

THE announcement made in several of the principal French daily papers, and copied into the English ones, to the effect that the British War Office had ordered a big dirigible from MM. Lebaudy Frères, turns out to have been a "mare's nest." The only dirigible on order with that firm for Great Britain is the dirigible ordered by the *Morning Post* five months ago.

"MOTORIST'S AND AVIATOR'S YEAR-BOOK."

SUCH is now the title of the year-book, edited by Mr. William List, the 1910 edition of which has just made its appearance. In accordance with the change in title, the contents have been added to in the form of a chronological record of progress in flight during the past year, full records of the performances at Rheims, Brescia, Blackpool and Doncaster, a list of the principal prizes offered for flying, and a list of aeronautical clubs and societies throughout the country. The other portions of

the book, which refer to motorists generally, have been brought up-to-date, and in some cases amplified, but always keeping to the same excellent arrangement in which the information is stated in a concise manner and grouped in sections, such as law, touring, garages, hotels, records, &c.

The book, which is published by Messrs. E. J. Larby, at 2s. net., also contains many tables of great use to motorists, &c.

CORRESPONDENCE.

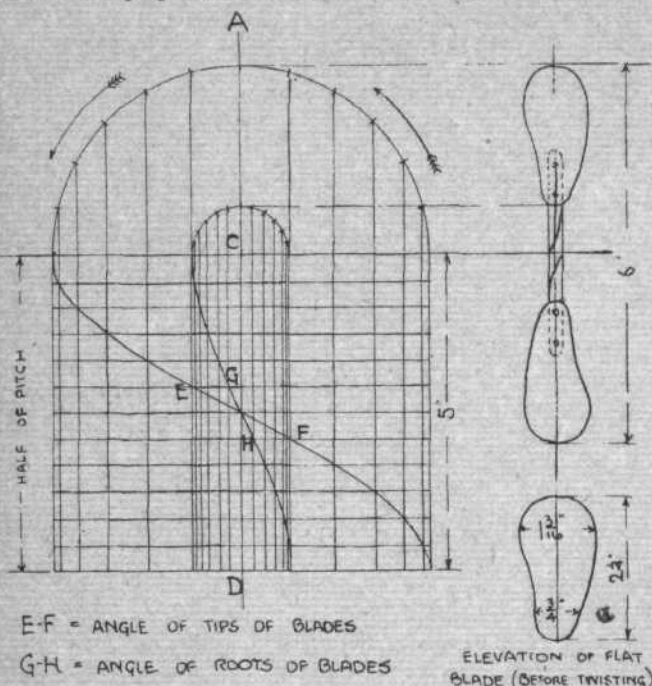
* * The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.

NOTICE.—Correspondents asking questions relating to articles which they have read in FLIGHT, would much facilitate our work of reference by kindly indicating the volume and page in their letters.

PROPELLER DESIGN.

To the Editor of FLIGHT.

SIR,—In answer to the question *re* designing a model propeller (by Messrs. "Gravity" and "Pressure") I should esteem it a favour if you would insert the enclosed in your next issue. I have experimented with model aeroplanes for some time past, and the enclosed rough sketch is of a propeller which I have used on one of my models with success. The motive power I use is two strands of $\frac{1}{8}$ in. square elastic, 18 ins. in length. This I find gives 200 revolutions at an average speed of about 30 revs. per sec., and an average thrust of .75 oz. The propeller is of 6 ins. diameter and 10 ins. pitch.



To design the propeller, draw a centre line, A—B, set off half the pitch, C—D, and draw lines through these points at right angles.

With a radius equal to half the diameter of the propeller, describe a semi-circle, as in the sketch, and complete the parallelogram as shown. Now divide the semi-circle into a number of equal parts, say 12, and divide the sides of the parallelogram into the same number of parts.

Draw lines from side to side of the parallelogram, and project the lines downwards from the points in the semi-circle. A line drawn through the lines of intersection is the path of the tip of the blade of the propeller through half a revolution.

Also, E—F is the angle which it is necessary to give the tip of the blade in order that it shall travel the pitch distance, viz., 10 ins.

The blades of this propeller I made of thin aluminium, and fixed them to a piece of ash $3\frac{1}{2}$ ins. long and $\frac{1}{4}$ in. square.

For the spindle I use copper wire, but I think brass would be better.

Yours truly,

Tufnell Park.

NELSON ROWLAND.

AUTOMATIC STABILITY.

To the Editor of FLIGHT.

SIR,—I have read with interest the letter by Mr. V. E. Johnson in your Journal some time ago on this subject, and thoroughly agree with him in this respect. The question to my mind is—do we want automatic stability (so called) that is given us by a mechanism which must necessarily be more or less complicated, and liable to get out of perfect arrangement, or do we want the stability which is inherent in the design of Mr. Latham's "Antoinette," which allows him to take both hands off his steering-gear and light a cigarette? The critics of his type might say, what would happen if a sudden gust of wind were to strike him at that moment? Well, he would probably have to grab his wheel pretty quick, but would that be a very great hardship? In steering a yacht one cannot afford to let go the helm for long, and what would happen to a motor cyclist if he let go his

handle-bar and struck a big stone when travelling at 50 miles an hour? The Wright machine certainly does not give this inherent stability, and therefore, though I admire it immensely, and Mr. Wright's handling of it, I do not think that it is a type that will survive. Personally, I am building a monoplane, and in the near future will aim at cutting down the wing spread, getting as much "automatic stability" as possible by means of a long "floating" tail (as differing from the Voisin weight-bearing tail), and giving the machine immense speed.

Southampton.

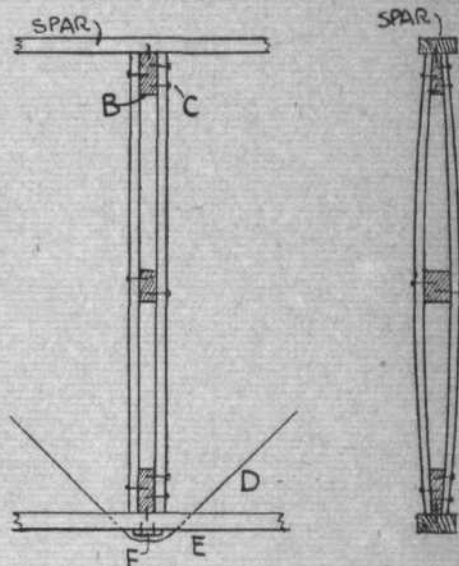
Yours truly,

GEALE DICKSON.

CONSTRUCTIVE DETAIL.

To the Editor of FLIGHT.

SIR,—In reply to "F. M.," December 4th, page 786, he says that he does not see how the wire D is got through the spar. It is got under the strut at E by boring a hole at an angle of 45° at E. The wire must not be bent too sharp at E, or it will not pull through easily. Nail a small strip of brass at each end of the strut, as at F. By referring to FLIGHT, No. 13, he will see how the wire is tightened. Struts can be either straight or curved, and can be made of deal or spruce, with a block B placed between the two sides and firmly glued and nailed as C with a pin from the block B into the spar. Struts made in this way are very strong and light, and, of course, can be made any width or length. When the planes are permanently built up the wire must be soldered to the brass strip, and the joints will not work, as a previous correspondent suggested.



Yours truly,

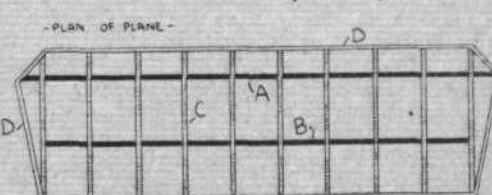
WALTER YEATMAN.

P.S.—I have invented a simple and effective wire tightener since I wrote you last. They could be turned out at 3d. a dozen, and sell at 1s. a dozen. Could you tell me of a firm who would be likely to take it up?

CONSTRUCTION OF MODEL PLANES.

To the Editor of FLIGHT.

SIR,—Your correspondents, "Gravity" and "Pressure," ask in the issue of FLIGHT of the 4th inst., "Which is the best way to construct the planes" of a model?



A Forward Spar
B Rear Spar
C Whalebone Ribs

D Linen binding
E Wooden Block

I send you herewith drawings of a method by which it is possible to easily construct planes with double surface, very light, and of great strength.

Ordinary whitewood does very well for the spars. Care should be taken

to see that their section is shaped according to the camber required. The whalebone strips produce this when screwed on above and below if the holes in them are drilled accurately. The

wood blocks should be oak or ash, or some wood that will not split easily. The whalebone is of the "imitation" or "French horn" species. For planes over a foot wide, strips of "Venesta" three-ply wood should be used instead of whalebone.

I have covered mine with "Dermisilk," using ordinary "Seccotine" for the purpose. They are adaptable to either monoplane or biplane.

Downham Market.

Yours faithfully,

(Rev.) HAROLD KELK.

PROPELLERS.

To the Editor of FLIGHT.

SIR,—The following extract from Maxim's "Artificial and Natural Flight" has caused me some trouble:—

Pages 147 and 148. . . . "Upon consulting an English experimenter, who had made a 'life-long study' of the question, he assured me that I should find the screw propeller very inefficient and very wasteful of power, and that all screw propellers had a powerful fan-blower action, drawing in air at the centre and discharging it with great force at the periphery. I found that no two men were agreed as to the action of screw propellers. All the data or formulae available were so confusing and contradictory as to be of no value whatsoever. Some of the experimenters were of the opinion that, in computing the thrust of a screw, we should only consider the projected area of the blades, and that the thrust would be equal to a wind blowing against a normal plane of equal area at a velocity equal to the slip. Others were of the opinion that the whole screw disc would have to be considered; that is, that the thrust would be equal to a wind blowing against a normal plane having an area equal to the whole disc, and at the velocity of the slip. The projected area of the two screw blades of my machine is 94 square feet, and the area of the two screw discs is 500 square feet. According to the first system of reasoning, therefore, the screw thrust of my large machine, when running at 40 miles an hour, with a slip of 18 miles per hour, would have been, according to the well-known formula,

$$V^2 \times .005 = P.$$

$$18^2 \times .005 \times 94 = 152.28 \text{ lbs.}$$

If, however, we should have considered the whole screw disc, it would have been $18^2 \times .005 \times 500 = 810 \text{ lbs.}$ However, when the machine was run over the track at this rate the thrust was found to be rather more than 2,000 lbs. When the machine was secured to the track, and the screws revolved until the pitch in feet, multiplied by the turns per minute, was equal to 68 miles an hour, it was found that the screw thrust was 2,164 lbs. In this case it was, of course, all slip, and when the screws had been making a few turns they had established a well-defined air-current, and the power exerted by the engine was simply to maintain this air-current. It is interesting to note that, if we compute the projected area of these blades by the foregoing formula, the thrust would be $68^2 \times .005 \times 94 = 2,173.28 \text{ lbs.}$, which is almost exactly the observed screw thrust."

This paragraph is more confusing than helpful. Referring to page 143, it is evident that Maxim has made an error in the foregoing calculations in putting down the slip as 18 m.p.h.; it should be 28 m.p.h. Using the correct slip, and assuming that the value .005 is correct, we get $28^2 \times .005 \times 500 = 1,960 \text{ lbs.}$, which is near the experimentally determined thrust of "rather more than 2,000 lbs."

In the case where $68^2 \times .005 \times 94 = 2,173 \text{ lbs.}$, the substitution of the value 500 for 94 gives us 11,560 lbs. thrust, which is altogether out of the question. Why does not the area of screw discs meet both cases, viz., for 28 m.p.h. and for 68 m.p.h.? I find that $29\frac{1}{2}^2 \times .005 \times 500 = \text{approx. } 2,173 \text{ lbs.}$ Can we assume for these particular propellers that at slips of over $29\frac{1}{2} \text{ m.p.h.}$:—

1. The area of screw discs cannot be used in calculating thrust.
2. That 2,173 lbs. is approximately the greatest thrust that these propellers are capable of giving.
3. That any energy imparted to the propellers which would give greater slip is wasted.
4. That the well-defined air current mentioned in the extracted paragraph, had a velocity nearer $29\frac{1}{2} \text{ m.p.h.}$ than 68 m.p.h.
5. That thrust could be improved by the addition of more blades.
6. That if the projected area was smaller in proportion than

$\frac{94}{500}$, the critical slip would have a lower value than $29\frac{1}{2}$.

Is this why experts differ?

One makes experiments at high speeds and swears by projected blade area; another makes experiments at low speeds and consequently swears by disc area; another makes experiments with badly shaped blades and wonders if projected area or disc area have anything whatever to do with his results; yet another experiments with rough surfaced blades, or propellers in which $\frac{D}{P}$ is disproportionately small, and finds that he has an excellent fan-blower.

If you can insert this letter in your correspondence columns perhaps some of your readers can give us a slip-thrust curve to show whether there is a "critical slip" point.

Yours faithfully,
C. H. CHALLENGER.

Bristol.

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